CCJM

ENVIRONMENTAL ENGINEERS & SCIENTISTS

FIVE-YEAR REVIEW REPORT

for

JOHNS MANVILLE DISPOSAL AREA

Waukegan, Illinois

CCJM Project Number N397

November 18, 1997

C.C. JOHNSON & MALHOTRA, P.C.

3310 Eagle Park Drive Ne, Suite 101
Grand Rapids, Michigan 49505
(616) 940-2007

SUPERFUND DIVISION
REMEDIAL RESPONSE BRANCH #2
SECTION #6

SITE NAME: Johns-Manville - Waukegan, IL

TYPE OF DOCUMENT: Five Year Review Report

INITIAL & DATE

RPM: BB 1/14/99

SALLY AVERILL: FOR SA 1-20-99

JAMES MAYKA: [signature] 1-20-99

WILLIAM E. MUNO: WEM 1/21/99

DEPUTY ~~REGIONAL ADMINISTRATOR~~: _____

~~REGIONAL ADMINISTRATOR~~: _____

RETURN TO: **LATONIA CAMBRIC** OR _____

PHONE# **6-3509** OR _____

COMMENTS: CONSENT DECREE CALLED FOR THE PRP'S TO PERFORM 5-YR REVIEWS. WE (AND IEPA) HAVE REVIEWED THIS REPORT, & RECOMMEND APPROVAL [signature]

(EPA:JD:10/06/98)

DATE: January 14, 1999

SUBJECT: Five-Year Review of the Johns-Manville Site, Waukegan, Illinois

FROM: Brad Bradley BB
Remedial Project Manager

TO: William E. Muno, Director
Superfund Division

Attached for your concurrence, is the Five-Year Review Report for the Johns-Manville NPL Site in Waukegan, Lake County, Illinois (the Site). In order to implement the Record of Decision (ROD) signed June 30, 1987, the Site was covered with soil, rip rap (shore line areas), and gravel (roadways). Remedial construction occurred from November 1988 through August 1991. Air and ground water monitoring were performed in conjunction with the remedial action. The Preliminary Closeout Report for the Site was signed on December 31, 1991 and an Explanation of Significant Differences documenting several changes between the ROD and what was actually constructed was issued on February 9, 1993. Operation and Maintenance (O&M) activities specified in the O&M Plan included soil cover, ground water, surface water (Lake Michigan), and air sampling to be conducted at five year intervals, beginning in 1996.

The first Five-Year Review sampling event was conducted in August 1996. The Final Five Year Review Report (the Report) was provided to EPA in November 1997. The only issue that was identified in the Report was an exceedance of the asbestos Maximum Contaminant Level (MCL) in monitoring well 10, adjacent to the southeast corner of the disposal area. Subsequent sampling conducted by Johns-Manville indicated that well 10 was within the asbestos MCL; however, to resolve this issue on a more permanent basis, EPA and Illinois EPA directed Johns-Manville to install an additional well between well 10 and Lake Michigan to determine if unacceptable levels of asbestos are migrating into the lake. This well, monitoring well W, was sampled in November 1998. Results indicate that the asbestos levels in well W are significantly below the asbestos MCL.

It is anticipated that the Site can be delisted as soon as deed restrictions are registered for the property and any outstanding State issues are resolved. These activities could be completed in 1999.

The Report will become part of the Administrative Record for the Site, and a copy of the approved report will be placed in the Site repository for the community to review. The Illinois EPA has been involved with this Five Year Review assessment and has reviewed and concurred with the recommendations summarized above. If you concur, please sign the appropriate line of the first page of the Report.

Attachment

FIVE YEAR REVIEW REPORT

for

Johns-Manville Disposal Area

Waukegan, Illinois

✓ I CONCUR

Wm. E. Muno
William E. Muno, Director
Superfund Division

_____ I DO NOT CONCUR

1/21/99
Date

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I. INTRODUCTION

A. Purpose

C.C. Johnson & Malhotra, P.C. (CCJM) has conducted a Five-Year Review of the Remedial Action (RA) conducted at the Johns Manville (Manville) Corporation Disposal Area, Waukegan, Illinois. This review was intended to evaluate whether the RA remains protective of public health and the environment.

Section 121(c) of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substance Contingency Plan (NCP) require that periodic (no less often than five years), reviews are to be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that will not allow for unlimited use or unrestricted exposure following the completion of all remedial actions for the site.

OSWER Directive 9355.7-02 (structure and components of Five-Year Reviews, May 23, 1991) provides for statutory five-year review of any site at which a post-SARA remedy, upon attainment of ROD Cleanup Levels, will not allow unlimited use and unrestricted exposure. The five-year review of the Johns Manville Disposal Area site RA was conducted in accordance with this policy.

The United States Environmental Protection Agency (EPA) has established a three-tier approach to conducting five-year reviews, the most basic of which provides a minimum protectiveness evaluation (Level I review). This level of review is based on site-specific considerations, including the nature of the response action, the status of the on-site activities, and proximity to populated areas and sensitive environmental areas. A Level I review was conducted of the Johns Manville Disposal Area Site and consisted of a review of documents associated with the RA; a site visit; sampling of soil cover (CAP), air, surface water and groundwater; and a review of the most recently collected groundwater, surface water, soil cover, and air sampling data.

The Johns Manville Corporation has performed the RA at the Disposal Area site in accordance with a Consent Decree signed on December 31, 1987 by Johns Manville, USEPA, United States Department of Justice, Illinois Environmental Protection Agency (IEPA), and the Illinois Office of the Attorney General. The major components of the selected remedial action are the installation of a two-foot thick soil cover with suitable vegetation on the landfill area, and establishment of groundwater, surface water, soil cover, vegetative cover, and ambient air monitoring programs for the site.

II. SUMMARY OF SITE CONDITIONS

A. Site Background

The Johns Manville property and the Disposal Area at Waukegan, Illinois are located along the western shore of Lake Michigan in the northeast corner of the City of Waukegan, Lake County, Illinois (Figure 1). The Disposal Area covers approximately 120 of the 300 acres owned at this location by Johns Manville. The Johns Manville property is bounded by the Illinois Beach State Park on the north, an old city dump site on the west, a coal fired electrical power generating station (Commonwealth Edison) on the south, and Lake Michigan on the east.

Historically the Disposal Area (120+ acres site) included a closed loop process water treatment and recycling system and manufacturing solid waste disposal areas (Figure 2). The solid waste disposal areas have been used for the disposal of wastes from the manufacturing of roofing materials, piping, and insulating products at the Waukegan manufacturing facilities since 1922. Three solid waste disposal areas (asbestos disposal pit, miscellaneous disposal pit, and sludge disposal pit) were in use immediately prior to the implementation of the RA. For purposes of the RA, the entire area that received manufacturing wastes is referred to as the Disposal Area. This included dykes and roadways as well as the active and inactive waste disposal areas.

Asbestos containing wastes have been deposited at the Disposal Area. These wastes are primarily cuttings and by-products from the manufacturing of asbestos-cement pipe and residues containing roofing and insulating materials. The Disposal Area has reportedly received both friable and non-friable asbestos since 1922. It has also received trace quantities of waste materials containing chromic oxide, lead, thiram, and xylenes.

The Johns Manville Disposal Area was placed on the EPA National Priorities List (NPL) of abandoned or uncontrolled hazardous waste sites in 1982. A Remedial Action Master Plan (RAMP) was prepared for the site in October 1993, a Remedial Investigation (RI) was completed in July, 1985, and a Feasibility Study (FS) was finalized in December 1986. A Record of Decision (ROD) was reached in July, 1987, a Consent Decree for Remedial Action at the site was signed on December 31, 1987, remedial construction was completed by fall, 1990. Post-Remedial Construction Soil Cover Sampling was conducted in Fall, 1991 and Post-Remedial Construction Air Monitoring was conducted in Spring, 1992.

B. Results of Site Investigations During Remedial Investigation (RI)

1. Groundwater

Groundwater at the site is located in glacial and post-glacial lacustrine deposits of well sorted sand. This 25 to 40-foot thick aquifer is underlain by a stiff sandy clay unit also of lacustrine origin. The clay unit varies in thickness from 50 to 75 feet. The glacial drift is underlain by a shallow, dolomite bedrock aquifer of Silurian Age. Other, deeper bedrock aquifers at the site include the Glenwood-St. Peter Sandstone, the Ironton-Galesville Sandstone and the Mount Simon Sandstone. Water level measurements in the uppermost aquifer at the site during remedial investigation have indicated the groundwater movement is northward and then eastward towards Lake Michigan. Water quality monitoring data of the uppermost aquifer collected during RI indicated that asbestos fibers as well as traces of lead, barium, copper, arsenic, boron and zinc were present in some of the samples. However, all of the detected compounds were present at levels below the drinking water standards.

2. Soil and Surface Contamination

Several surface, near-surfacc and sub-surface soil samples were collected from on-site and off-site locations during the RI. In general, chromium levels were low and lead levels were relatively high. Levels of organic contaminants were relatively low and the asbestos content was below 1.0%.

3. Air

Air at the site was suspected to contain airborne asbestos at levels that could be a health risk. On-site and off-site locations were used for ambient air monitoring for asbestos. Samples were analyzed by transmission electron microscopy (TEM). Fibers longer than five micrometers (generally associated with health risk) were at or very close to the detection limits.

III. SUMMARY OF RESPONSE ACTIONS

The Remedial Construction was completed by Manville Corporation in accordance with the December 31, 1987 Consent Decree and included the following actions:

A. Groundwater Monitoring Program

A groundwater monitoring program was established to determine the background levels of potential contaminants in the groundwater through eight rounds of quarterly monitoring using 13 monitoring wells (Figure 2), and to detect any future contamination migration from the site. Eight quarterly rounds of groundwater sampling have been completed prior to the sampling for this five-year review. The groundwater samples were analyzed for VOCs, BNAs, PCBs, PBBs, dissolved metals (aluminum, antimony, arsenic, total chromium, and lead), and asbestos. The results obtained were statistically analyzed and submitted to EPA. The results obtained through these monitoring events showed that the detected levels of analyzed parameters were within the drinking water standards and no detected contaminants were migrating off-site.

The groundwater monitoring program currently in effect consists of measuring static water levels and collecting samples from 13 on-site monitoring wells (Figure 2) once every five years after the remedial construction. All groundwater samples are to be analyzed for VOCs, BNAs, PCBs, PBBs, dissolved metals (aluminum, antimony, arsenic, total chromium, and lead), and asbestos. The First Five-Year Post-Remedial Construction Groundwater Sampling and static water level measurement was performed in September 1996. The next round of groundwater sampling is scheduled for September 2001.

All of the monitoring wells installed at the Disposal Area are set in the lacustrine sand, above the stiff clay unit. Depth to groundwater is approximately 6 to 10 feet bgs. The monitoring wells are in good physical condition. No decrease in groundwater production or increase in sample collection difficulty from these wells has occurred.

Data collected during the First Five-Year Post-Remedial Construction Sampling Event is presented in Tables, 1, 2, and 3. A complete evaluation of this data is presented in the First Five-Year Post-Remedial Construction Groundwater and Surface Water Monitoring Report (March 1997)

Static water level measurements were made during all of the groundwater monitoring events to the nearest 0.01 of a foot and referenced to the top of the casing. The major groundwater flow directions from the site have always been northerly towards the Industrial Canal/Pond and easterly towards Lake Michigan. In addition, groundwater from the southeastern portion of the site generally flows southeasterly towards the Commonwealth Edison cooling water pond. Some of the groundwater in the Disposal Area appears to initially flow westward due to the mounding effect of the process water

treatment pond and pumping out of water from the cooling water recycling pond before it ultimately flows eastward to Lake Michigan. The data from the first Five-Year Post-Remedial Construction Groundwater Sampling Event (September, 1996) has also exhibited similar groundwater flow patterns.

None of the groundwater quality data collected from the on-site (Figure 2) monitoring wells (upgradient and downgradient) during the first Five-Year Post-Remedial Construction Groundwater Monitoring contained organic compounds (VOCs, BNAs, PCBs, PBBs and pesticides) or dissolved metals (aluminum, antimony, arsenic, total chromium, and lead) at levels that exceeded either their background levels or MCLs. Asbestos levels measured in groundwater samples collected during this same period however, were highly variable. Statistical analysis of the asbestos data shows that the asbestos levels detected in the downgradient monitoring wells do not exceed the levels of asbestos detected in the upgradient monitoring wells.

B. Surface Water Monitoring Program

A surface water monitoring program involving Lake Michigan water sampling at three locations was established to determine the background levels of contaminants associated with the site and to assess off-site migration of contaminants. Two of the surface water sampling locations are just off shore, east of the Disposal Area, and the third location is the City of Waukegan water supply raw water intake (south of the Disposal Area) (Figure 2). Eight quarterly rounds of surface water sampling have been completed prior to the surface water sampling for this Five-Year Review. The surface water samples were analyzed for the same parameters as the groundwater samples. The surface water monitoring results were statistically analyzed and submitted to EPA. The results obtained through these monitoring events showed that the detected levels of the analyzed parameters were within the drinking water standards and no detected contaminants were migrating off-site.

The surface water monitoring program currently in effect consists of collecting samples from these three locations in Lake Michigan once every five years after the remedial construction. The surface water samples are to be analyzed for the same parameters as the groundwater samples. The First Five-Year Post-Remedial Construction Sampling of surface water was performed in September 1996. The next surface water sampling event is due September 2001.

Surface water samples were collected from two locations in Lake Michigan immediately offshore of the Disposal Area and from the raw water intake for the City of Waukegan water supply.

Data collected during this sampling event is presented in Tables 4, 5, and 6. A complete evaluation of this data is presented in the First Five-Year Post-Remedial Construction Groundwater and Surface Water Monitoring Report (March 1997).

None of the analytical data collected from any of the surface water samples collected during this First Five-Year Monitoring Event contained VOCs, BNAs, PCBs, PBBs, pesticides, dissolved metals, or asbestos at levels that exceeded either their background levels or MCLs.

C. Soil Cover Installation and Monitoring

The RA for the site included installation of a 24-inch thick soil cover, with vegetation, over specified areas of the facility. Waste materials/soil in the inactive waste disposal areas of the site (excluding peripheral roads) were graded and covered with 24 inches of compacted non-asbestos containing soils.

Except on sloped surfaces (greater than 20%), the cover consisted of six inches of sand overlain by 15 inches of native clayey soil. On sloped surfaces, the six-inch sand layer was replaced with eight inches of clayey soil (making a total of 23 inches of native clayey soil) which provides equivalent freeze/thaw protection as the 21" sand and clayey soil cover for level areas. Three inches of topsoil were then placed over the clayey soil cover, and a vegetative cover was established and maintained.

The soil cover has been maintained by Manville. Maintenance activities include repairing eroded areas, grading roadways, and conducting visual inspections of the cover two times a year (spring and fall). Mowing of the vegetative cover has now been discontinued. This activity was discontinued (with the approval of EPA) because it was observed that the mower was beginning to cause erosion of the soil cover. This was especially significant on the slopes.

A soil cover monitoring program to monitor the condition of the vegetative cover and possible up-migration of asbestos through the cover was included in the RA. As part of the Amended Remedial Actions Work Plan, and as set forth in the Quality Assurance Project Plan (QAPP-September 1988) soil borings are to be conducted through the soil cover to monitor up-migration, if any, of asbestos containing material (ACM) through the soil cover. Immediately after the completion of the remedial construction visual monitoring of the vegetative cover and soil cover sampling for asbestos up-migration were conducted. No asbestos up-migration was observed through the use of soil cover samples collected at six-inch depth intervals from ten different locations approved by USEPA. Also the vegetative cover was found to be in good condition. The First Five-Year Post-Remedial Construction Soil Cover Monitoring Event was conducted during September 1996. The soil cover sampling locations are shown on Figure 3. The data collected during this sampling event is presented in Table 7. A more detailed description of this sampling event is presented in the First Five-Year Post-Remedial Construction Soil Cover Sampling Report (April 1997).

No suspect ACM was visually observed in any of the soil cover samples obtained from the ten (10) soil cover sampling locations during the First Five-Year Post-Remedial Construction Soil Cover Sampling Event. In addition, no asbestos was detected by the laboratory in any of the soil samples collected. Based on this information, upward migration of ACM does not appear to be occurring through the 24-inch thick soil cover. Since no ACM was encountered in the 12 to 18-inch depth interval during the first two Post-Remedial Construction Soil Cover Sampling Events, the interval between soil cover sampling events can be increased from 5 to 10 years as described in the approved Work Plan for RA. Thus, the next soil cover sampling event should be conducted in the fall of 2006.

D. Ambient Air Monitoring Program

An ambient air monitoring program was established to determine if the contaminants from the Disposal Area are impacting the quality of air in the vicinity of the site after the RA.

An integral task of the RA at the Disposal Area is an ambient air monitoring program for particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), lead, total chromium and asbestos. This air monitoring is required to be conducted after the completion of the remedial construction work and establishment of the vegetative cover, and every five years thereafter, for a minimum period of 15 years.

Ambient air monitoring was conducted after the completion of the remedial construction and consisted of sampling of the ambient air at two locations upwind (Figure 4) of the site, and five locations on the

site (Figure 5). Three samples (each of a duration of 24 hours ± one hour) for PM_{10}, lead, and total chromium analysis and five samples (12 hours ± one hour duration) for asbestos analysis were collected from each of the sampling locations. None of the observed levels exceeded the ambient air quality standards or the monitored parameters.

The First Five-Year Post-Remedial Construction Ambient Air Monitoring Event was conducted in August, 1996 using the same locations as for the previous air monitoring event.

The data collected during this sampling event is summarized in Tables 8, 9, 10, and 11. Detailed evaluation and statistical analysis of this data is presented in the First Five-Year Post-Remedial Construction Ambient Air Monitoring Report (April 1997).

Very low levels of PM_{10} were detected at all of the off-site and on-site ambient air sampling locations. None of the concentrations detected exceeded the ambient air quality standard for PM_{10} ($150\mu g/m^3$).

Very low levels of lead were detected at all of the off-site and on-site ambient air sampling locations. All of the detected concentrations were at levels below the ambient air quality standard for lead of $1.5\ \mu g/m^3$.

No chromium was detected in any of the ambient air samples collected.

No asbestos was detected by TEM in any of the ambient air samples collected. The detection limit for all of the asbestos samples was below the ambient air quality standard of 0.01 fibers/cc.

Based on analysis of the data generated during the air monitoring event, it does not appear that the covered wastes or the activities at the Disposal Area are having a detrimental or degrading effect on ambient air quality on or near the site, and the RA implemented is still very effective.

IV. REMEDIAL OBJECTIVES

A. Soil Cover Installation and Monitoring, Groundwater Monitoring, Surface Water and Air Monitoring

The soil cover was installed to eliminate direct contact with the waste and prevent waste in the Disposal Area from emitting asbestos fibers or dust particles containing chrome and/or lead into the ambient air. Soil cover monitoring is included in the RA to assure that the implemented remedy is providing the protection it is designed to provide and the asbestos containing material is not up-migrating through the soil cover because of freeze/thaw effects. The well established vegetative cover, absence of asbestos in the samples of the soil cover and absence of any adverse impact on the quality of ambient air all show that tile implemented remedy is still very effective.

The groundwater and surface water monitoring program is to assess if any of the contaminants from the site are migrating off-site and/or degrading the quality of groundwater and surface water on and/or near the site. The results of the recent monitoring event show no adverse impacts or off-site contaminant migration. Thus the results of the groundwater, surface water, soil cover, and ambient air monitoring show that the remedial objectives are being accomplished. Data collected from each of these monitoring systems have not indicated any release of contaminants from the Disposal Area.

V. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Five-Year Review guidance established policy for EPA is to review and analyze the remedial action at a site as it is affected by newly promulgated or modified Federal and State environmental laws. ARARs associated with the construction and long-term maintenance and monitoring of the RA at the Johns Manville Disposal Area were presented and addressed in the Feasibility Study Report (December 1986). ARARs that have been promulgated since the signing of the Consent Decree are presented below.

- National Secondary Drinking Water Regulations, Final Federal Register 56:20:3526 (January 30, 1991)
- SOCs and IOCs, Final Rule, Federal Register 57:138:31776 (July 17, 1992)
- SOCs and IOCs, Final Rule, Federal Register 56:20:3526 (January 30, 1992)
- Lead and Copper, Final Rule, Federal Register 56:110:26460 (June 7, 1991)

These ARARs all pertain to MCLs or SMCLs for contaminants in drinking water. These latest MCLs have been utilized for evaluating the groundwater and surface water data collected during the September 1996 groundwater and surface water sampling event.

VI. SUMMARY OF SITE VISIT

The Johns Manville Disposal Area was visited on September 3 through September 6, 1996 by CCJM staff. The purpose of the site visit was to collect soil cover, groundwater, and surface water samples. During the course of these tasks, site activities and the general physical condition of the site were observed. The IEPA project manager and a representative of Johns Manville were also present for the initiation of the soil cover sampling.

A. Site Use

Johns Manville still actively manufacturers roofing materials at the Waukegan plant; although at a reduced scale over the last five years. Due to this reduction, some of the buildings or portions of buildings that housed the manufacturing operations are now empty or unused and also the amount of solid wastes and process water generated are proportionately lesser.

B. Groundwater Monitoring System

As noted above, the groundwater monitoring system was last used in September 1996. All of the monitoring wells were capped, locked, and intact. No damaged well casings were observed.

C. Soil Cover

Although no formal visual soil cover inspection was conducted by CCJM as part of the most recent site visit, general observations of the soil cover were made during soil cover sampling from ten different locations. The soil cover appeared to be in good physical condition and well maintained.

VII. RECOMMENDATIONS

Based on observations made during the September 1996 site visit, it appears that the soil cover remedy remains effective at the Johns Manville Disposal Area. This conclusion is supported by the data collected during the

August 1996 Ambient Air Sampling Event and the September 1996 Groundwater, Surface Water, and Soil Cover Sampling Events. None of the potential contaminants were detected above either background levels or MCLs.

As long as Johns Manville continues the maintenance of the soil cover, the soil cover remedy should continue to contain the potential contaminants, preventing direct human or animal contact and release to ambient air and/or surface and groundwater in the vicinity of the site.

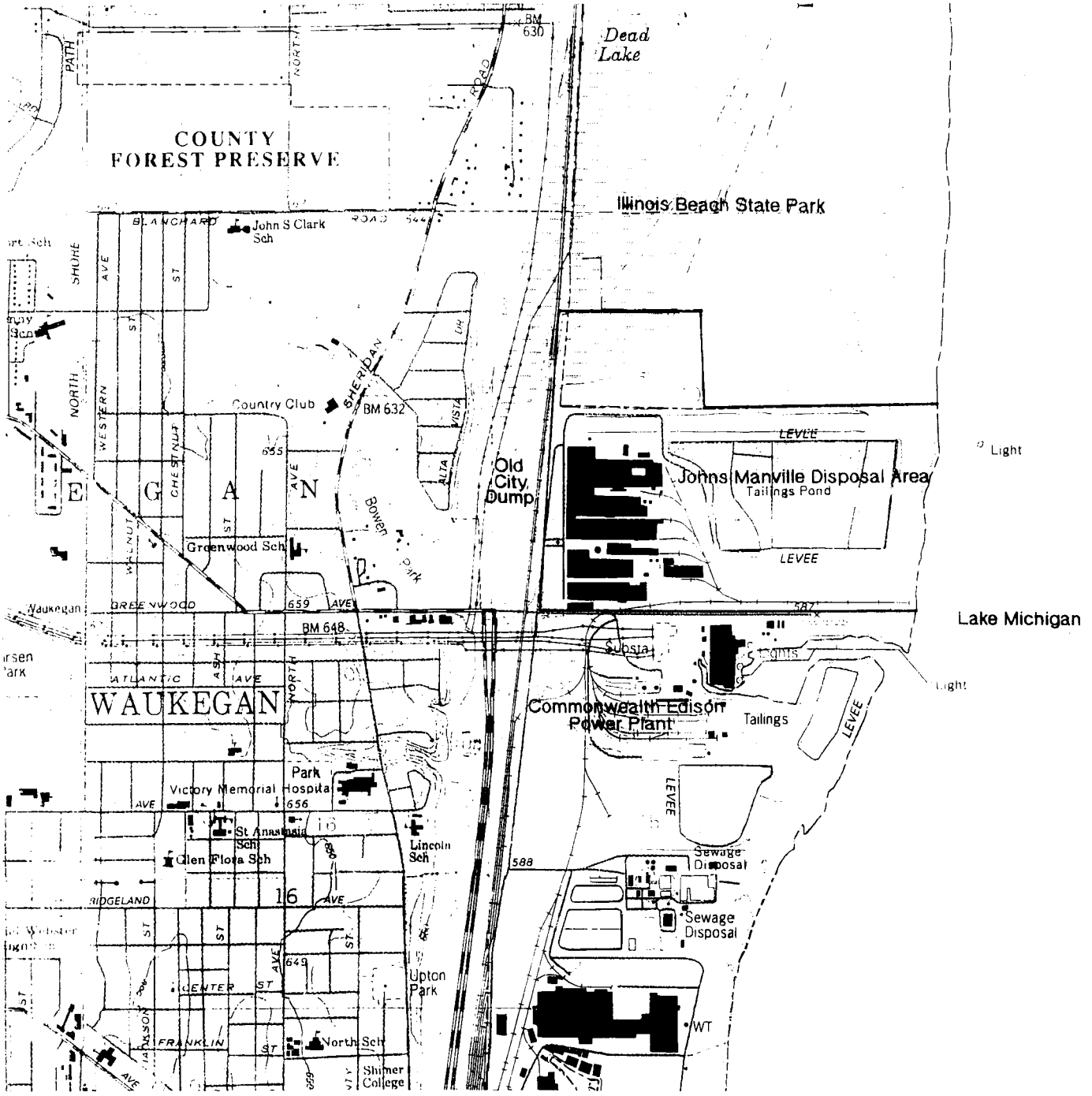
VIII. STATEMENT OF PROTECTIVENESS

The soil cover remedy is both operational and functional. This RA continues to provide adequate protection of human health and the environment.

IX. NEXT REVIEW

It is probable that hazardous substances, pollutants, or contaminants will remain at the Johns Manville Disposal Area site which will not allow for unlimited use or unrestricted exposure. Another Five-Year Review should be completed by November 20, 2001. This review will be a Level I Review, consisting of a review of all groundwater, surface water, soil cover, and ambient air monitoring data, and newly promulgated environmental laws.

FIGURES



USGS 7.5' Quadrangles: Waukegan, Illinois (1993) and Zion, Illinois (1993)

LAKE COUNTY

0 0.5 1

Approxamate Scale in Miles

N

SITE LOCATION MAP

Johns Manville
Waukegan Disposal Area
Waukegan, Illinois

Nov., 1997

Figure: 1

C.C. Johnson & Malhotra, P.C.

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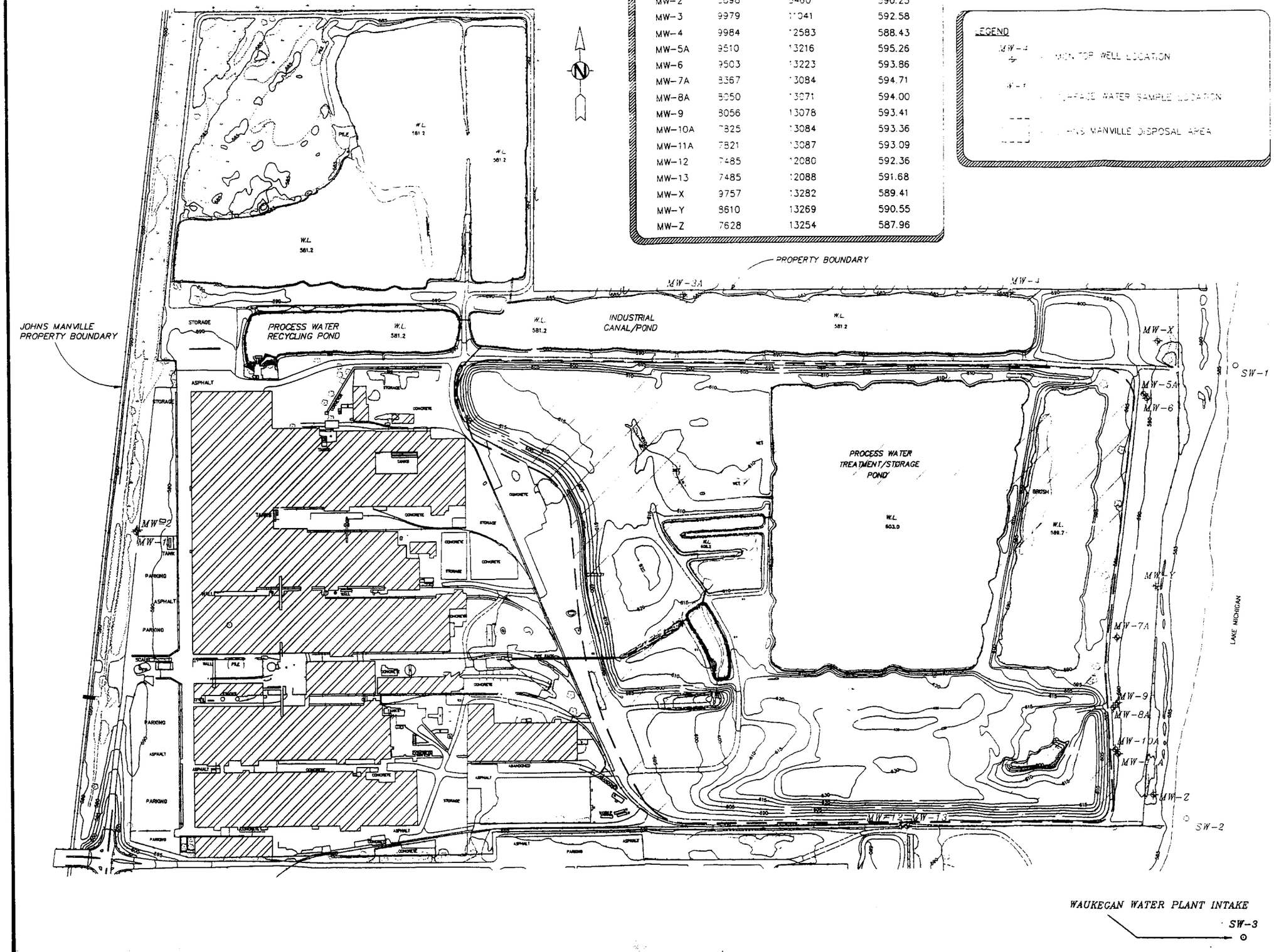
MONITOR WELL SURVEY

WELL	NORTHING	EASTING	T.O.C. ELEVATION
MW-1	8891	8455	590.40
MW-2	8898	8460	590.25
MW-3	9979	11041	592.58
MW-4	9984	12583	588.43
MW-5A	9510	13216	595.26
MW-6	9503	13223	593.86
MW-7A	8367	13084	594.71
MW-8A	8050	13071	594.00
MW-9	8056	13078	593.41
MW-10A	7825	13084	593.36
MW-11A	7821	13087	593.09
MW-12	7485	12080	592.36
MW-13	7485	12088	591.68
MW-X	9757	13282	589.41
MW-Y	9610	13269	590.55
MW-Z	7628	13254	587.96

LEGEND

- MW-4 — MONITOR WELL LOCATION
- SW-1 — SURFACE WATER SAMPLE LOCATION
- JOHNS MANVILLE DISPOSAL AREA



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NO.	REVISIONS	BY	DATE
	REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS	BY	DATE

JOHNS MANVILLE PROPERTY AND DISPOSAL AREA
WAUKEGAN, ILLINOIS

DESIGNED BY	DATE
DRAWN BY BWC	DATE FEB. 1997
CHECKED BY	DATE
EDIT	FILE
SCALE 1" = 350'	
DRAWING 1	
PLOT	

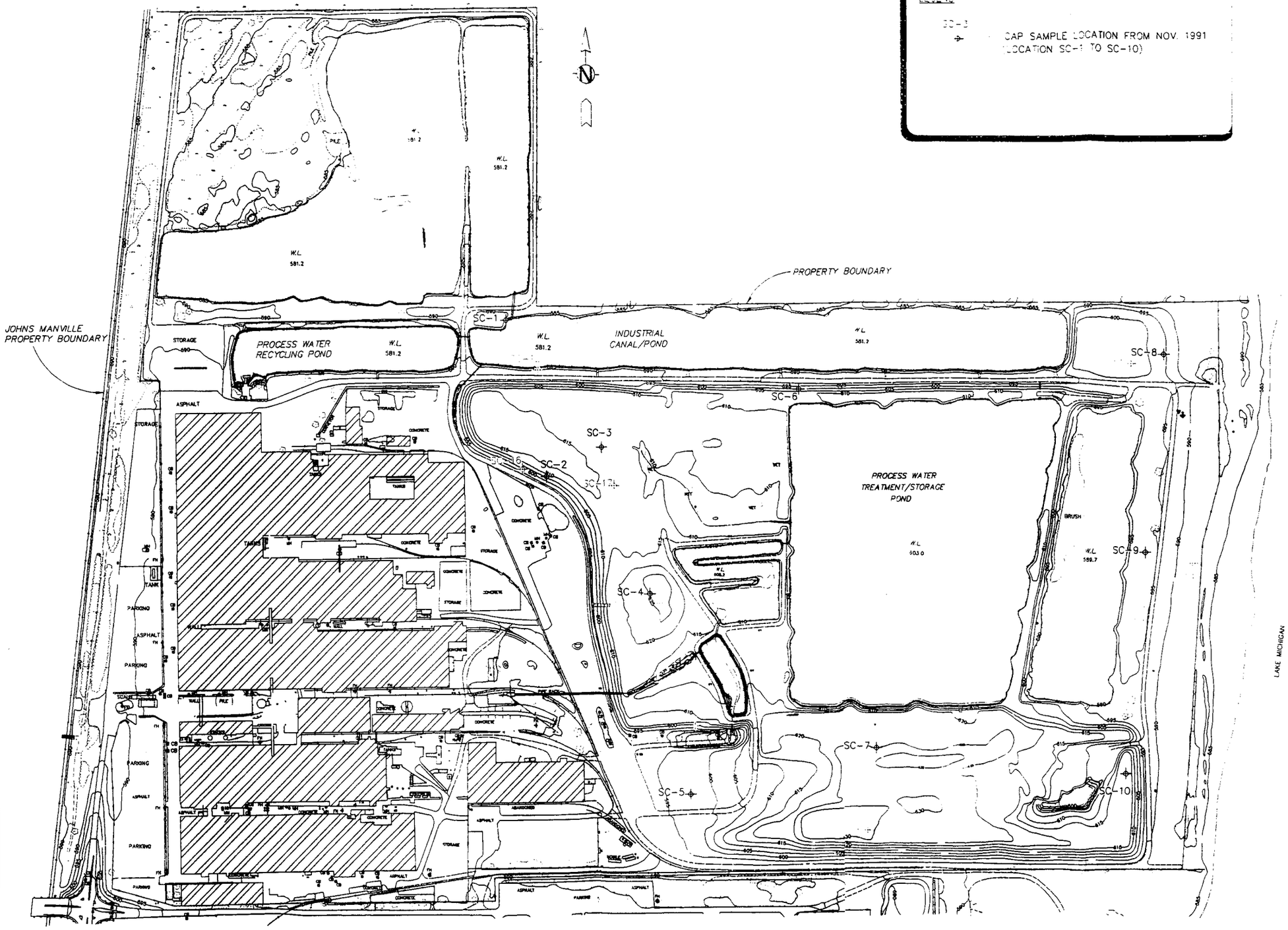
PROJECT : JOHNS MANVILLE

FIGURE NO.

2

LEGEND

SC-3 → CAP SAMPLE LOCATION FROM NOV. 1991 (LOCATION SC-1 TO SC-10)



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	REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS	BY	DATE

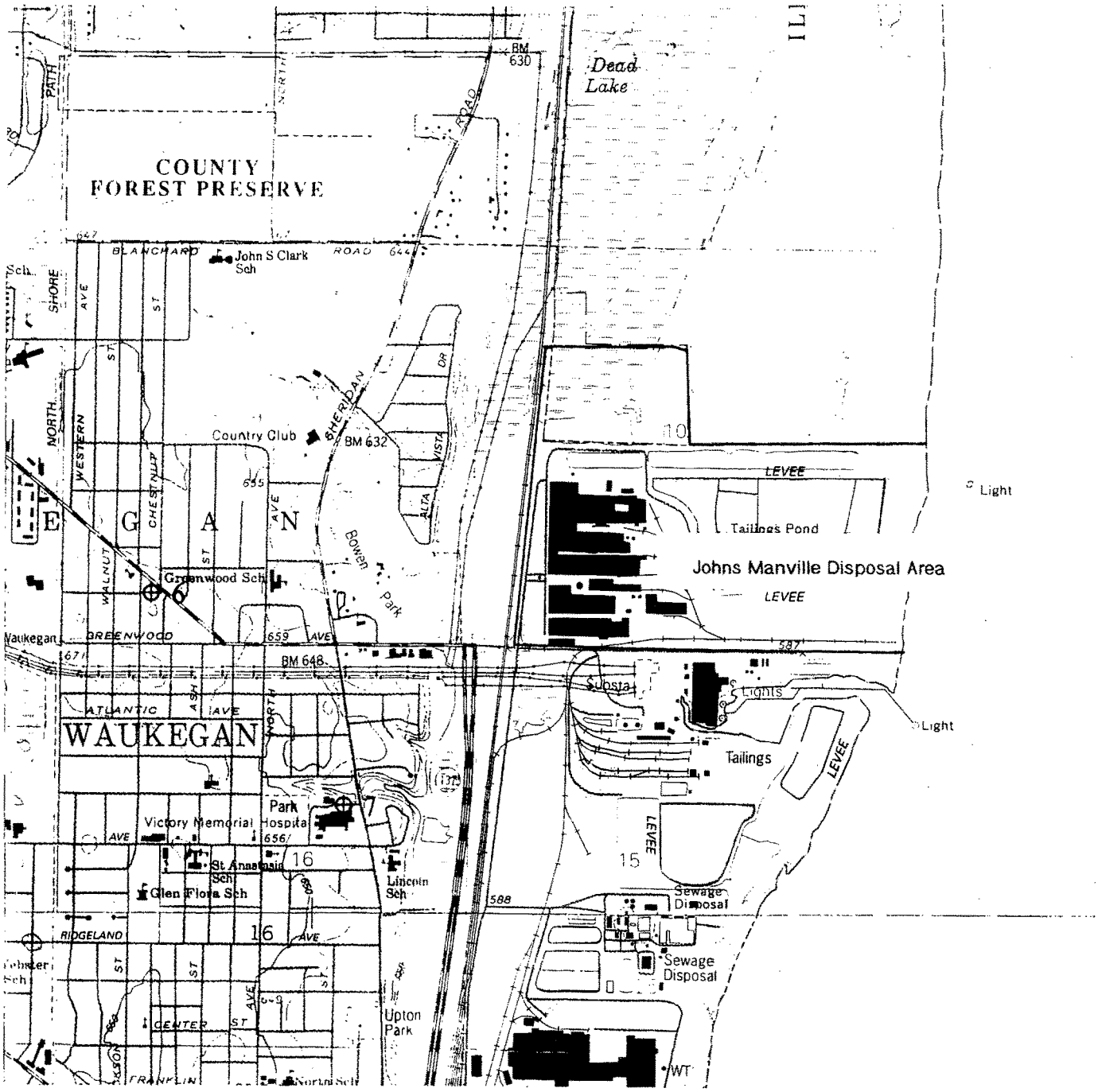
SOIL COVER SAMPLE LOCATION MAP

JOHNS MANVILLE DISPOSAL AREA
WAUKEGAN, ILLINOIS

DESIGNED BY	DATE
DRAWN BY BWC	DATE FEB. 1997
CHECKED BY	DATE
EDIT	FILE

SCALE 1" = 350'
DRAWING 1
PLOT

PROJECT : JOHNS MANVILLE
FIGURE NO. 3



USGS 7.5' Quadrangles: Waukegan, Illinois (1993) and Zion, Illinois (1993)

⊕6 Waukegan Fire Department Station Number 4

⊕7 United Blood Service/Victory Memorial Hospital

0 0.5 1

Approximate Scale in Miles

N

OFF-SITE AIR SAMPLING LOCATIONS

Johns Manville
Waukegan Disposal Area
Waukegan, Illinois

Nov., 1997 Figure: 4

C.C. Johnson & Malhotra, P.C.

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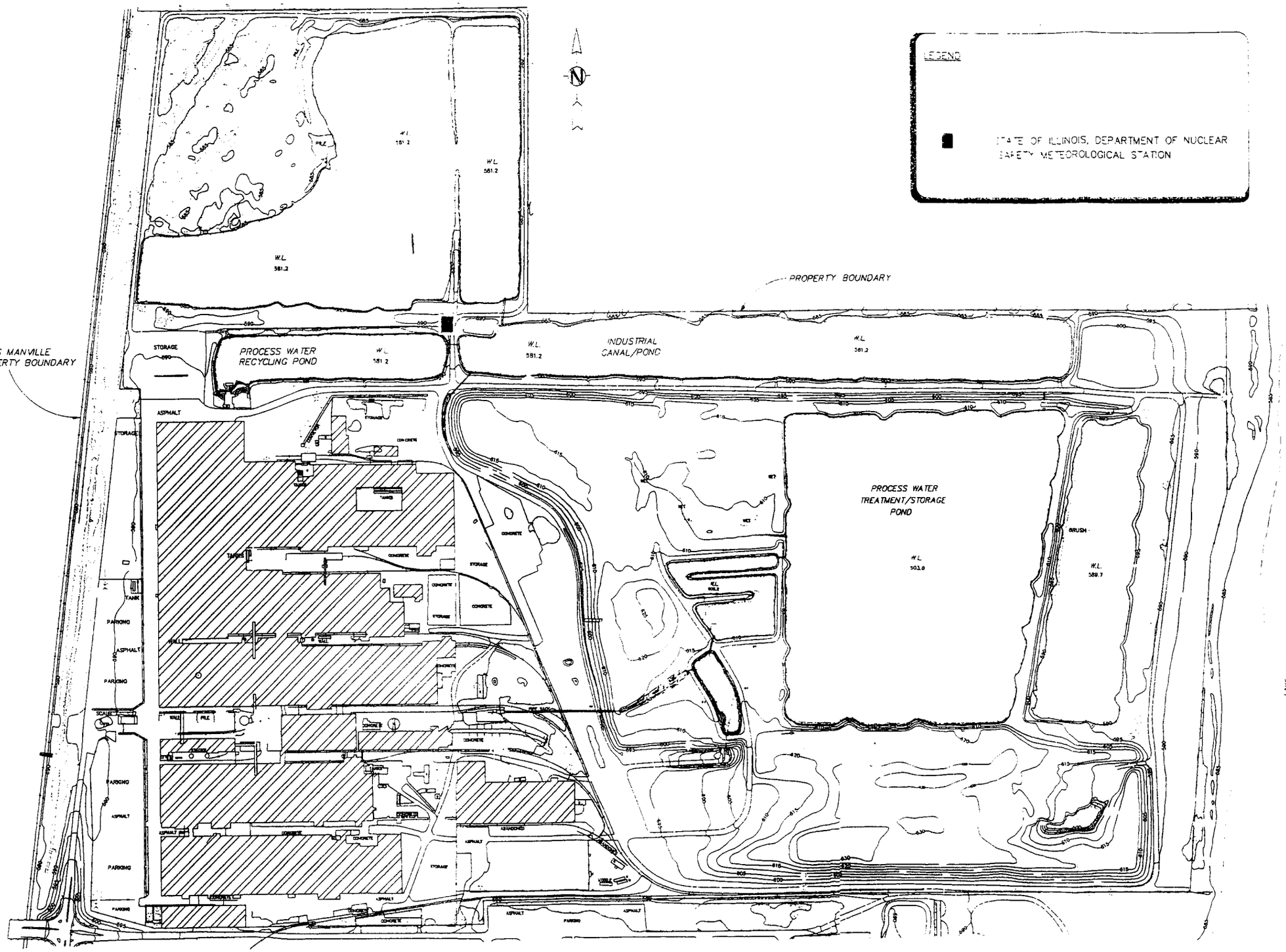

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NO.	REVISIONS	BY	DATE
	REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS	BY	DATE

ON-SITE AIR SAMPLING LOCATIONS

JOHNS MANVILLE DISPOSAL AREA
WAUKEGAN, ILLINOIS

DESIGNED BY	DATE
DRAWN BY BWC	DATE FEB. 1997
CHECKED BY	DATE
EDIT	FILE

SCALE 1" = 350'

DRAWING 1

PLOT

PROJECT : JOHNS MANVILLE

FIGURE NO.

5

TABLES

TABLE 1

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS FOR ORGANIC COMPOUNDS
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

	Analytical Results (ug/L)							
Parameter	MRA-MW01-09	MRA-MW02-09	MRA-MW03-09	MRA-MW04-09	MRA-MW05A-09	MRA-MW05A-09-D	MRA-MW06-09	MRA-MW07A-09
Volatile Organic Compounds								
Vinyl Chloride	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
Acetone	< 10 (UJ-C)	< 10 (UJ-C)	10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
Bromoform	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Semivolatile Organic Compounds								
2,2-Oxybis(1-Chloropropane)	< 10 (UJ-C)	< 10 (UJ-C)	< 10	< 10	< 10	< 10	< 10	< 10
4-Chloroaniline	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
3-Nitroaniline	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)
4-Nitrophenol	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)
4-Nitroaniline	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)
3,3-Dichlorobenzidine	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
Benzo (k) Fluoranthene	< 10 (UJ-C)	< 10 (UJ-C)	< 10	< 10	< 10	< 10	< 10	< 10
Dibenz (a,h) Anthracene	< 10 (UJ-C)	< 10 (UJ-C)	< 10	< 10	< 10	< 10	< 10	< 10
Benzo (g,h,i) Perylene	< 10 (UJ-C)	< 10 (UJ-C)	< 10	< 10	< 10	< 10	< 10	< 10
Di-n-Butylphthalate	< 10 (UJ-B)	< 10	< 10	< 10	< 10	< 10	< 10	< 10
bis (2-Ethylhexyl) Phthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pesticides, PCBs, and PBBs								
No Pesticides, PCBs, or PBBs Were Detected In Any Of The Groundwater Samples Collected During This Sampling Round None of the Pesticides, PCBs, or PBBs Analytical Results Were Qualified By Data Validation								

	Analytical Results (ug/L)							
Parameter	MRA-MW08A-09	MRA-MW09-09	MRA-MW09-09-D	MRA-MW10A-09	MRA-MW11-09	MRA-MW12-09	MRA-MW13-09	MRA-MWFB-09
Volatile Organic Compounds								
Vinyl Chloride	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10	< 10 (UJ-C)
Acetone	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
Bromoform	< 10	< 10	< 10	< 10	< 10	< 10	< 10 (UJ-C)	< 10
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10 (UJ-C)	< 10
Semivolatile Organic Compounds								
2,2-Oxybis(1-Chloropropane)	< 10	< 10	< 10	< 10	< 10	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
4-Chloroaniline	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
3-Nitroaniline	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)
4-Nitrophenol	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)
4-Nitroaniline	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)
3,3-Dichlorobenzidine	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
Benzo (k) Fluoranthene	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 (UJ-C)
Dibenz (a,h) Anthracene	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 (UJ-C)
Benzo (g,h,i) Perylene	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10 (UJ-C)
Di-n-Butylphthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
bis (2-Ethylhexyl) Phthalate	< 10	< 10	< 10	< 10	4 (J)	< 10	< 10	< 10
Pesticides, PCBs, and PBBs								
No Pesticides, PCBs, or PBBs Were Detected In Any Of The Groundwater Samples Collected During This Sampling Round None of the Pesticides, PCBs, or PBBs Analytical Results Were Qualified By Data Validation								

UJ-B - Undetected, but the number that is reported as the quantitation limit is an estimated value. The data point was qualified due to blank contamination problems.

UJ-C - Undetected, but the number that is reported as the quantitation limit is an estimated value. The data point was qualified due to instrument calibration problems.

J - The analyte was positively identified. The numerical value is the approximate concentration of the analyte because it is lower than the quantitation limit.

TABLE 2

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS FOR DISSOLVED METALS
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

Parameter	Analytical Results (ug/L)								Maximum Contaminant Levels (ug/L)
	MRA-MW01-09	MRA-MW02-09	MRA-MW03-09	MRA-MW04-09	MRA-MW05A-09	MRA-MW05A-09-D	MRA-MW06-09	MRA-MW07A-09	
Dissolved Aluminum	30.0	13.5	11.8	20.6	17.4	27.4	15.3	25.3	50
Dissolved Antimony	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	6
Dissolved Arsenic	< 2.0	6.2	< 2.0	< 2.0	6.4	6.3	5.1	14.8	50
Dissolved Total Chromium	< 2.0 (UJ-I)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.6 (UJ-B)	100
Dissolved Lead	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	15

Parameter	Analytical Results (ug/L)								Maximum Contaminant Levels (ug/L)
	MRA-MW08A-09	MRA-MW09-09	MRA-MW09-09-D	MRA-MW10A-09	MRA-MW11-09	MRA-MW12-09	MRA-MW13-09	MRA-MWFB-09	
Dissolved Aluminum	17.4	23.3	20.3	26.5	25.6	29.4	33.8	34.7	50
Dissolved Antimony	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	< 19.0	6
Dissolved Arsenic	6.4	3.7	5.4	4.7	7.1	35.2	< 2.0	< 2.0	50
Dissolved Total Chromium	3.3 (UJ-B)	2.05 (UJ-B)	< 2.0	< 2.0	2.4 (UJ-B)	< 2.0	< 2.0	< 2.0	100
Dissolved Lead	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	15

UJ-B - Undetected, but the number that is reported as the quantitation limit is an estimated value. The data point was qualified due to blank contamination problems.

UJ-I - Undetected, but the number that is reported as the quantitation limit is an estimated value. The data point was qualified due to interference problems.

TABLE 3

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS FOR ASBESTOS
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

Sample Identification	Analytical Results (MFL)			Maximum Contaminant Level* (MFL)
	Fibers Greater Than 10 Microns Long	Total Fibers	Detection Limits	
MRA-MW01-09	1.1	82	1.1	7.1
MRA-MW02-09	< 1.1	< 1.1	1.1	7.1
MRA-MW03-09	< 1.1	1.1	1.1	7.1
MRA-MW04-09	< 0.2	0.9	0.2	7.1
MRA-MW05A-09	< 1.1	< 1.1	1.1	7.1
MRA-MW05A-09-D	< 1.1	2.2	1.1	7.1
MRA-MW06-09	2.8	290	2.8	7.1
MRA-MW07A-09	< 1.1	1.1	1.1	7.1
MRA-MW08A-09	< 5.5	630	5.5	7.1
MRA-MW09-09	1.1	28	1.1	7.1
MRA-MW09-09-D	1.1	31	1.1	7.1
MRA-MW10A-09	17	180	1.8	7.1
MRA-MW11-09	4.4	78	1.1	7.1
MRA-MW12-09	2.6	130	1.3	7.1
MRA-MW13-09	< 1.1	< 1.1	1.1	7.1
MRA-MWFB-09	< 0.2	< 0.2	0.2	7.1

MFL - Million Fibers Per Liter
* - For fibers greater than 10 microns long

TABLE 4

SUMMARY OF SURFACE WATER SAMPLE ANALYSIS FOR ORGANIC COMPOUNDS
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

Parameter	Analytical Results (ug/L)					
	MRA-SW1-09	MRA-SW2-09	MRA-SW2-09-D	MRA-SW3-9	MRA-SW00-09FB	TRIP BLANK
Volatile Organic Compounds						
Acatone	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
1,1-Dichloroethene	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
2-Butanone	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
4-Methyl-2-Pentanone	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
2-Hexanone	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)
Semivolatile Organic Compounds						
4-Chloroaniline	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	< 10 (UJ-C)	NA
3-Nitroaniline	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	NA
4-Nitrophenol	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	NA
4-Nitroaniline	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	< 25 (UJ-C)	NA
Pesticides, PCBs, and PBBs						
No Pesticides, PCBs, or PBBs Were Detected In Any Of The Surface Water Samples Collected During This Sampling Round. None of the Pesticides, PCBs, or PBBs Analytical Results Were Qualified By Data Validation.						NA

UJ-C - Undetected, but the number that is reported as the quantitation limit is an estimated value. The data point was qualified due to instrument calibration problems

NA - Not Analyzed

TABLE 5

SUMMARY OF SURFACE WATER SAMPLE ANALYSIS FOR DISSOLVED METALS
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

Parameter	Analytical Results (ug/L)					Maximum Contaminant Level (ug/l)
	MRA-SW1-09	MRA-SW2-09	MRA-SW2-09-D	MRA-SW3-9	MRA-SW00-09FB	
Dissolved Aluminum	66.8	66.8	69.5	77.4	41.5	50
Dissolved Antimony	< 19.0	19.0	< 19.0	< 19.0	< 19.0	6
Dissolved Arsenic	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	50
Dissolved Total Chromium	< 2.0	< 2.0	3.5 (UJ-B)	2.6 (UJ-B)	< 2.0	100
Dissolved Lead	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	15

UJ-B - Undetected, but the number that is reported as the quantitation limit is an estimated value. The data point was qualified due to blank contamination problems.

TABLE 6

SUMMARY OF SURFACE WATER SAMPLE ANALYSIS FOR ASBESTOS
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

Sample Identification	Analytical Results (MFL)			Maximum Contaminant Level* (MFL)
	Fibers Greater Than 10 Microns Long	Total Fibers	Detection Limits	
MRA-SW01-09	< 0.2	0.2	0.2	7.1
MRA-SW02-09	< 0.2	1.1	0.2	7.1
MRA-SW02-09-D	< 0.2	0.4	0.2	7.1
MRA-SW03-09	< 0.2	1.1	0.2	7.1
MRA-SW00-09-FB	< 0.1	< 0.1	0.1	7.1

* - For fibers greater than 10 microns long
MFL - Million Fibers Per Liter

TABLE 7

ANALYTICAL RESULTS
SOIL COVER SAMPLING
JOHNS MANVILLE
WAUKEGAN DISPOSAL AREA
FIRST FIVE-YEAR POST-REMEDIAL CONSTRUCTION SAMPLING, SEPTEMBER 1996

Sample Number	Sampling Depth Interval (inches)	Asbestos (Percent of Total Sample by Weight)		
		Chrysotile	Crocidolite	Total
MRA-SC11-04	18 to 24	ND	ND	ND
MRA-SC12-04	18 to 24	ND	ND	ND
MRA-SC13-04	18 to 24	ND	ND	ND
MRA-SC14-04	18 to 24	ND	ND	ND
MRA-SC15-04	18 to 24	ND	ND	ND
MRA-SC15-04-D	18 to 24	ND	ND	ND
MRA-SC16-04	18 to 24	ND	ND	ND
MRA-SC17-04	18 to 24	ND	ND	ND
MRA-SC18-04	18 to 24	ND	ND	ND
MRA-SC19-04	18 to 24	ND	ND	ND
MRA-SC20-04	18 to 24	ND	ND	ND

ND - Not Detected

TABLE 8

SUMMARY OF ANALYTICAL RESULTS FOR PM10 AMBIENT AIR
Johns Manville
Waukegan Disposal Area
First Five-Year Post-Remedial Construction Sampling, August 1996

Sampling Date	Sample Number	Sampling Station Location	Wind Direction	Total PM10 (mg/filter)	PM10 Concentration In Ambient Air(mg/m3)	Ambient Air Standard ug/m3
8-7-96	AM96-01-PM10-01	Station - 01	SW/NW	21.9	0.03	150
to	AM96-02-PM10-01	Station - 02	SW/NW	17.9	0.022	150
8-8-96	AM96-03-PM10-01	Station - 03	SW/W	43.9	0.038	150
	AM96-04-PM10-01	Station - 04	SW/NW	42.9	0.03	150
	AM96-05-PM10-01	Station - 05	SW/W	46.9	0.034	150
	AM96-06-PM10-01	Fire Station	SW/NW	26.3	0.019	150
	AM96-07-PM10-01	Blood Bank	SW/NW	42.3	0.033	150
8-8-96	AM96-01-PM10-02	Station - 01	N/NW-SW	19.9	0.022	150
to	AM96-02-PM10-02	Station - 02	W/W	15.9	0.02	150
8-9-96	AM96-03-PM10-02	Station - 03	W/NW-SW	62.9	0.056	150
	AM96-04-PM10-02	Station - 04	N/N	32.9	0.021	150
	AM96-05-PM10-02	Station - 05	N-NW/NW	31.9	0.023	150
	AM96-06-PM10-02	Fire Station	N-NW/SW	15.3	0.011	150
	AM96-07-PM10-02	Blood Bank	N/NW-SW	23.3	0.018	150
	AM96-FB-(ON SITE) - PM10-02	Station - 03	W/NW-SW	1.1	NA	NA
	AM96-FB-(OFF SITE) - PM10-0	Fire Station	N-NW/SW	0.7	NA	NA
8-9-96	AM96-01-PM10-03	Station - 01	Variable	16.9	0.016	150
to	AM96-02-PM10-03	Station - 02	ESE/ESE	25.9	0.019	150
8-10-96	AM96-03-PM10-03	Station - 03	ESE/E	25.9	0.023	150
	AM96-04-PM10-03	Station - 04	E/E	22.9	0.016	150
	AM96-05-PM10-03	Station - 05	ESE/ESE	18.9	0.014	150
	AM96-06-PM10-03	Fire Station	SE-NE/SE-NE	16.3	0.012	150
	AM96-07-PM10-03	Blood Bank	SE-NE/SE-NE	24.3	0.018	150
	AM96-FB-(ON SITE) - PM10-03	Station - 03	ESE/E	2.7	NA	NA

NA = Not Applicable

TABLE 9

SUMMARY OF ANALYTICAL RESULTS FOR LEAD IN AMBIENT AIR
Johns Manville
Waukegan Disposal Area
First Five-Year Post-Remedial Construction Sampling, August 1996

Sampling Date	Sample Number	Sampling Station Location	Wind Direction	Total Lead (ug/filter)	Lead Concentration In Ambient (ug/m3)	Ambient Air Standard ug/m3
8-7-96	AM96-01-PBCR-01	Station - 01	SW/NW	0.034	0.00002	1.5
to	AM96-02-PBCR-01	Station - 02	SW/NW	0.049	0.00002	1.5
8-8-96	AM96-03-PBCR-01	Station - 03	SW/W	0.032	0.00001	1.5
	AM96-04-PBCR-01	Station - 04	SW/NW	0.028	0.00001	1.5
	AM96-05-PBCR-01	Station - 05	SW/W	0.026	0.00001	1.5
	AM96-06-PBCR-01	Fire Station	SW/NW	0.026	0.00001	1.5
	AM96-07-PBCR-01	Blood Bank	SW/NW	0.049	0.00003	1.5
8-8-96	AM96-01-PBCR-02	Station - 01	N/NW-SW	0.018	0.00001	1.5
to	AM96-02-PBCR-02	Station - 02	W/W	0.023	0.00001	1.5
8-9-96	AM96-03-PBCR-02	Station - 03	W/NW-SW	0.03	0.00001	1.5
	AM96-04-PBCR-02	Station - 04	N/N	0.014	0.00001	1.5
	AM96-05-PBCR-02	Station - 05	N-NW/NW	0.019	0.00001	1.5
	AM96-06-PBCR-02	Fire Station	N-NW/SW	0.018	0.00001	1.5
	AM96-07-PBCR-02	Blood Bank	N/NW-SW	0.018	0.00001	1.5
	AM96-FB(ON SITE) - PBCR-02	Station - 03	W/NW-SW	ND	NA	NA
8-9-96	AM96-01-PBCR-03	Station - 01	Variable	0.013	0.00001	1.5
to	AM96-02-PBCR-03	Station - 02	ESE/ESE	0.02	0.00001	1.5
8-10-96	AM96-03-PBCR-03	Station - 03	ESE/E	0.014	0.00001	1.5
	AM96-04-PBCR-03	Station - 04	E/E	0.013	0.00001	1.5
	AM96-05-PBCR-03	Station - 05	ESE/ESE	0.01	0.00000	1.5
	AM96-06-PBCR-03	Fire Station	SE-NE/SE-NE	0.016	0.00001	1.5
	AM96-07-PBCR-03	Blood Bank	SE-NE/SE-NE	0.014	0.00001	1.5
	AM96-FB(ON SITE) -PBCR-03	Station - 03	ESE/E	ND	NA	NA
	AM96-FB(OFF SITE) -PCBR-03	Blood Bank	SE-NE/SE-NE	ND	NA	NA

ND = Not Detected
NA = Not Applicable
Detection Limit = 0.002 ug/filter

TABLE 10

SUMMARY OF ANALYTICAL RESULTS FOR CHROMIUM IN AMBIENT AIR
Johns Manville
Waukegan Disposal Area
First Five-Year Post-Remedial Construction Sampling, August 1996

Sampling Date	Sample Number	Sampling Station Location	Wind Direction	Total Chromium (ug/filter)	Total Chromium Concentrations in Ambient Air (ug/m3)	Total Chromium Concentrations in Ambient Air (ug/m3)
8-7-96	AM96-01-PBCR-01	Station - 01	SW/NW	ND	ND	Not Established
to	AM96-02-PBCR-01	Station - 02	SW/NW	ND	ND	Not Established
8-8-96	AM96-03-PBCR-01	Station - 03	SW/W	ND	ND	Not Established
	AM96-04-PBCR-01	Station - 04	SW/NW	ND	ND	Not Established
	AM96-05-PBCR-01	Station - 05	SW/W	ND	ND	Not Established
	AM96-06-PBCR-01	Fire Station	SW/NW	ND	ND	Not Established
	AM96-07-PBCR-01	Blood Bank	SW/NW	ND	ND	Not Established
8-8-96	AM96-01-PBCR-02	Station - 01	N/NW-SW	ND	ND	Not Established
to	AM96-02-PBCR-02	Station - 02	W/W	ND	ND	Not Established
8-9-96	AM96-03-PBCR-02	Station - 03	W/NW-SW	ND	ND	Not Established
	AM96-04-PBCR-02	Station - 04	N/N	ND	ND	Not Established
	AM96-05-PBCR-02	Station - 05	N-NW/NW	ND	ND	Not Established
					ND	Not Established
	AM96-06-PBCR-02	Fire Station	N-NW/SW	ND	ND	Not Established
	AM96-07-PBCR-02	Blood Bank	N/NW-SW	ND	ND	Not Established
	AM96-FB(ON SITE) -PBCR-02	Station - 03	W/NW-SW	--	NA	NA
8-9-96	AM96-01-PBCR-03	Station - 01	Variable	ND	ND	Not Established
to	AM96-02-PBCR-03	Station - 02	ESE/ESE	ND	ND	Not Established
8-10-96	AM96-03-PBCR-03	Station - 03	ESE/E	ND	ND	Not Established
	AM96-04-PBCR-03	Station - 04	E/E	ND	ND	Not Established
	AM96-05-PBCR-03	Station - 05	ESE/ESE	ND	ND	Not Established
	AM96-06-PBCR-03	Fire Station	SE-NE/SE-NE	ND	ND	Not Established
	AM96-07-PBCR-03	Blood Bank	SE-NE/SE-NE	ND	ND	Not Established
	AM96-FB(ON SITE) - PBCR-03	Station - 03	ESE/E	ND	NA	NA
	AM96-FB(OFF SITE) -PBCR-03	Blood Bank	SE-NE/SE-NE	ND	NA	NA

ND = Not Detected
NA = Not Applicable
Detection Limit = 0.012 ug/filter

TABLE 11

SUMMARY OF ANALYTICAL RESULTS FOR ASBESTOS BY TEM IN AMBIENT AIR
Johns Manville
Waukegan Disposal Area
First Five-Year Post-Remedial Construction Sampling, August 1996

Sampling Date	Sample Number	Sampling Station Location	Wind Direction	Asbestos Fibers Concentrations in Ambient Air (All size fibers/cc)	Ambient Air Standard fibers/cc
8-7-96	AM96-01-TEM-01	Station - 01	SW/NW	ND	0.01
	AM96-02-TEM-01	Station - 02	SW/NW	ND	0.01
	AM96-03-TEM-01	Station - 03	SW/W	ND	0.01
	AM96-04-TEM-01	Station - 04	SW/NW	ND	0.01
	AM96-05-TEM-01	Station - 05	SW/W	ND	0.01
	AM96-06-TEM-01	Fire Station	SW/NW	ND	0.01
	AM96-07-TEM-01	Blood Bank	SW/NW	ND	0.01
	AM96-LB-TEM-BOX 1-01	Laboratory	NA	ND	NA
8-8-96	AM96-01-TEM-02	Station - 01	W/NW-SW	ND	0.01
	AM96-02-TEM-02	Station - 02	W/W	ND	0.01
	AM96-03-TEM-02	Station - 03	W/NW-SW	ND	0.01
	AM96-04-TEM-02	Station - 04	N/N	ND	0.01
	AM96-05-TEM-02	Station - 05	N-NW/NW	ND	0.01
	AM96-06-TEM-02	Fire Station	N-NW/SW	ND	0.01
	AM96-07-TEM-02	Blood Bank	N-NW/SW	ND	0.01
8-9-96	AM96-01-TEM-03	Station - 01	Variable	ND	0.01
	AM96-02-TEM-03	Station - 02	ESE/ESE	ND	0.01
	AM96-03-TEM-03	Station - 03	ESE/E	ND	0.01
	AM96-04-TEM-03	Station - 04	E/E	ND	0.01
	AM96-05-TEM-03	Station - 05	ESE/ESE	ND	0.01
	AM96-06-TEM-03	Fire Station	SE-NE/SE-NE	ND	0.01
	AM96-07-TEM-03	Blood Bank	SE-NE/SE-NE	ND	0.01
	AM96-FB (ON SITE)-TEM-03	Station - 03	ESE/E	ND	NA
	AM96-FB(OFF SITE)-TEM-03	Blood Bank	SE-NE/SE-NE	ND	NA
8-10-96	AM96-01-TEM-04	Station - 01	NW-SW/N	ND	0.01
	AM96-02-TEM-04	Station - 02	E/NE	ND	0.01
	AM96-03-TEM-04	Station - 03	E/NE-SW	ND	0.01
	AM96-04-TEM-04	Station - 04	E/NE-SW	ND	0.01
	AM96-05-TEM-04	Station - 05	N/NE-SW	ND	0.01
					0.01
	AM96-06-TEM-04	Fire Station	E/NE-SW	ND	0.01
	AM96-07-TEM-04	Blood Bank	Variable/W	ND	0.01
8-11-96	AM96-01-TEM-05	Station - 01	NE-SE/NE-SE	ND	0.01
	AM96-02-TEM-05	Station - 02	E/NE-SE	ND	0.01
	AM96-03-TEM-05	Station - 03	E/NE-SE	ND	0.01
	AM96-04-TEM-05	Station - 04	E/NE	ND	0.01
	AM96-05-TEM-05	Station - 05	Variable/N	ND	0.01
	AM96-06-TEM-05	Fire Station	Variable/NE-SE	ND	0.01
	AM96-07-TEM-05	Blood Bank	N/NE-SE	ND	0.01